FINAL REPORT

SAMPLING AND ANALYSIS PLAN
SOIL CHARACTERIZATION

10300713

ENTERPRISE RECOVERY SYSTEMS
BYHALIA, MISSISSIPPI

Prepared for
Enterprise Recovery Systems Site Group
Byhalia, Mississippi

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WCC File 93B477

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1.0
INTRODUCTION

This Sampling and Analysis Plan (SAP) has been prepared by Woodward-Clyde Consultants (WCC) for the Soil Investigation (SI) at the Enterprise Recovery Systems (ERS) site (herein referred to as the "Site"). The Site is located on Cayce Road in Byhalia, Mississippi. The assessment described in this SAP is intended to define the nature and extent of soil contamination above the water table in areas previously identified as contaminated by releases of hazardous substances and to screen soil for contamination at additional locations selected by the U.S. Environmental Protection Agency (EPA). WCC has been retained by the ERS Site Group to conduct this assessment.

The SAP describes the protocols to be followed during implementation of the proposed scope of work for the ERS Site. Section 2.0 of this SAP presents the project background and a brief site description. Section 3.0 describes the scope of work. Section 4.0 describes soil sampling procedures.

2.0
SITE BACKGROUND AND DESCRIPTION

The ERS Site is located at Route 5 Box 287 on Cayce Road, approximately one quarter mile off U.S. Highway 72 just inside the Mississippi State line southeast of Collierville, Tennessee (Figure 1). The Site consist of eight acres of property in the NW 1/4, Section 22, Township 1 South, Range 4 West. Major features at the site during operations included:

- Office Warehouse (50 x 100 feet)
- A diked above-ground tank area with three storage tanks (67 x 20 feet)
- An above-ground storage tank area with 16 tanks (80 x 45 feet)
- The main drum warehouse (70 x 60 feet)
- A small drum warehouse (40 x 30 feet)
- A small surface water retention basin (33 x 16 x 4.5 feet)
- Two unloading paved areas
- Several acres occupied by sparse wooded and grassy zones

Environmental assessments of the soil and groundwater were performed by the EPA, Mississippi Department of Environmental Quality (MDEQ), and several independent engineering firms from December 1989 through March 1993 at the site. These investigations detected concentrations of a number of hazardous substances in the soil and groundwater (Figure 2). As a result of these assessments, EPA has set soil cleanup standards for the following compounds at the site: ethylbenzene, toluene, trichloroethylene, xylene, acetone, methyl ethyl ketone, and 1,1,1 trichloroethane.

3.0
SCOPE OF WORK

3.1 OVERVIEW OF WORK

The purpose of the soil investigation is to define and characterize soil contamination to the first saturated zone or to 15 feet below land surface (bls), whichever is encountered first. Five potential problem areas identified by the EPA's previous investigation or during site removal activity will be assessed. In addition, WCC will collect and analyze by head space analysis 20 soil samples from locations selected by EPA.

The following activities will be performed at the site:

- A reconnaissance of the site will be performed to locate the five previously identified areas, and to identify other potential sampling areas as directed by the EPA.

- The location of the proposed surficial shallow soil samples will be marked prior to sample collection.

- Up to 60 surficial soil samples (from 6 to 12 inches) will be collected with a pre-cleaned stainless auger within the 5 previously identified areas. A head-space analysis will be performed on each sample using an Organic Vapor Analyzer (OVA) to field quantify the presence of VOCs.

- The installation of up to 15 shallow hand auger borings will be performed in those areas exhibiting the highest levels of VOCs. These borings will terminate at the first saturated zone or at 15 feet below grade if a saturated zone is not identified before that depth. Head-space analysis will be performed at 2-foot intervals, or as conditions dictate.

- Collection of soil samples for laboratory analysis in accordance with the guidelines outlined in EPA SW-846, Method 8240 for VOCs. Up to 30 samples may be collected for laboratory analysis. Laboratory analysis will be performed on selected surficial soil samples and soil samples collected from each boring.

- One or more site plans depicting the sample locations and corresponding field OVA head space and laboratory analytical results will be developed.

- A report detailing the activities and findings of this investigation will be developed. Laboratory QA/QC results will also be provided with the report.

A detailed description of the sampling methodologies are discussed in the following sections.

4.0 SOIL SAMPLING PROCEDURES

4.1 SAMPLE COLLECTION

Two types of samples will be collected during this phase of work: (1) surficial soil samples, and (2) subsurface soil samples. The surficial soil samples will be collected from the designated sample locations using either a stainless steel bucket auger or a stainless steel core type sample with a butyrate liner. A core of soil from the surface to 12 inches will be collected at each sample location. If the sample is collected from the bucket auger, the top portion (from 0 to 6 inches) will be discarded. The remaining 6- to 12-inch portions will be processed as follows:

- The sample will be cut in half and the outside of each half will be shaved to negate any influence from the sampling equipment.

- A representative portion of one of the sample halves will be placed promptly in a laboratory sample container for possible laboratory analysis and stored on ice and cooled to 4° C.

- A representative portion of the remaining sample half will be placed in a precleaned one pint mason jar and sealed for head-space analysis.

If the butyrate liner method is used, the core within the liner will be labelled and placed on ice for possible laboratory analysis. The bucket auger will then be used to ream out the hole and the cuttings for that interval prepared for head-space analysis. Head-space analysis of the soil samples will be conducted as follows:

- The soil sample will be sealed in a one-pint mason jar as soon as possible upon extraction.

- The jar will be shaken for approximately five to ten seconds and then allowed to sit for ten minutes before a headspace reading is made.

- Headspace analysis of the sample will be performed with a Foxboro Organic Vapor Analyzer by pushing the OVA probe through the mason jar seal. The probe will remain in the jar until a maximum reading is reached. This reading will be recorded in the log book.

The OVA will be calibrated prior to sampling by using a single known sample of methane-in-air. The OVA will then be zeroed by using a known sample of zero air. The OVA will be zeroed after each sampling event and as the instrument dictates.

WCC will collect up to 60 shallow soil samples for field screening to define the surficial limits of the identified problem areas. These shallow soil samples will be located using a tiered approach (Figure 3) as follows:

- Four surficial samples will be collected in or near each identified area. The four soil samples will be collected and head-spaced using the OVA. This will be the first tier of soil samples collected in the identified area.

- Depending on the OVA head-space results for each identified area, four additional surficial samples may be collected along a second tier outside of the first tier. The distance between tiers will vary depending on the measured soil vapor concentration and visual observation. For example, a first tier sample OVA measurement of 100 ppm may indicate a need for a second tier sample location at 10 to 15 feet away.

- Depending on the OVA results for the second tier, a third tier of sampling may be appropriate based on the above rationale to further define the horizontal extent of the area.

Following the surficial soil sampling, WCC will place three deep hand auger borings in or near each identified area. A precleaned hand-auger will be used at each boring location to obtain the soil samples. A total of 15 borings will be performed at the site with a core type sampler with a butyrate liner, as previously described. These borings will extend no deeper than the first shallow groundwater or to a depth of 15 feet below land surface (bls), whichever is encountered first. All borings will be visually logged to identify the soil lithology and soil samples will be collected and processed as previously described on 2-foot centers and head-spaced using the OVA. Following the completion of all deep borings, WCC will grout the boring close using a cement bentonite mixture. All cuttings removed from the hole will be containerized for proper disposal.

A minimum of one soil sample from each of these borings will be shipped to the laboratory for analytical analysis in accordance with the guidelines outlined in EPA SW-846, Method 8240 for VOCs. Selection of soil samples to be submitted to the laboratory will be based on the head-space results and/or the proximity of the sample above a water bearing unit. Generally, the soil sample with the highest OVA head-space reading will be submitted to the laboratory. If a soil sample is collected above an identified water-bearing unit, this sample will also be submitted to the laboratory for analysis. If no head-space readings are detected above background, the sample collected near the base of the boring will be submitted to the laboratory. In addition, WCC will be prepared to split all samples identified for laboratory analysis with EPA.

Several soil samples collected with the surficial soil sampling activities will also be submitted to the laboratory to aid in the correlation of the OVA head-space results with the analytical results. Up to 30 soil samples may be submitted for laboratory analysis.

In addition to the sampling described above, WCC will collect and field screen up to 20 additional soil samples from on-site locations selected by the EPA. These samples will be field screened in the same manner as described above.

4.2 SAMPLE ANALYSIS

Samples will be analyzed by Analytical Technologies, Inc. Laboratory of Pensacola, Florida. The analytical method to be used to determine the concentrations of the constituents of concern are outlined in Table 1. The required precision, accuracy, detection limits, and percent recovery specifications (if applicable) are identified by the method listed in Table 1. Precise and well recognized techniques are to be used for the analysis of soil samples.

4.3 DECONTAMINATION PROCEDURES

Sampling equipment used to collect the shallow soil samples (e.g., hand augers, bowls) will be decontaminated prior to and subsequent to sample collection. Decontamination of sampling equipment will occur in the exclusion zone. All sampling equipment will be cleaned between each sample location or at intervals as described below:

- Washing in a phosphate-free detergent solution (Liquinox).
- Rinsing with tap water.
- Rinsing with organic-free water.
- Rinsing twice with methanol.
- Rinsing with organic-free water and allow to air dry as long as possible.
- If organic-free water is not available, allow equipment to air dry as long as possible. Do not rinse with deionized or distilled water.

After decontamination, the sampling equipment will be wrapped in aluminum foil for protection until subsequent use. Following decontamination events, all wash water and disposable personal protection equipment (PPE) will be containerized for proper disposal.

4.4 SAMPLE IDENTIFICATION

Samples will be identified by alpha-numeric code sequence. The first three characters of each sample code will be "ERS" to denote the Enterprise Recovery Systems Site, followed by a number which represents the phase of work. This character group will be followed by a hyphen. The second alpha-numeric sample identification character group will use the following convention:

Code	Identification
SS	Surface soil sample
SB	Soil boring sample
SD	Sediment sample
RS	Rinsate sample
TB	Trip Blank
FB	Field Blank

The above group will be followed by a hyphen. The next three characters are numeric and represent the sample location. These sample numbers will be posted on a site map to identify the sample location.

Final characters may be added to some samples to distinguish the sample type as needed, using the following format:

D	Duplicate sample
S	Split sample
C	Composite sample
G	Grab sample

Following the procedures above for sample identification, the sample identification number for the first round of sampling for a grab, surface soil sample is: ERS1-SS-001G.

A waterproof pen will be used to complete sample labels during sample collection procedures. The completed labels will contain, at a minimum, the following information: project name, site name, sampling personnel, sample identification codes, date and time of sample collection, analyses to be performed, and preservatives (if applicable).

4.5 SAMPLE HANDLING

Subsequent to sampling, all samples will be labelled (Section 4.4) and placed on ice in an ice chest. Samples will be packed to avoid sample container movement or breakage. Prior to shipping, a chain of custody will be completed, placed in a sealable plastic bag, and taped to the inside lid of the ice chest. The chain of custody will contain appropriate sampling information including: project name, site name, sampling personnel, sample identification codes, date and time of sample collection, number of containers for each sample, analyses to be performed, preservatives and any other pertinent information. A copy of the chain-of-custody will be retained for the project files. The ice chest will then be sealed with strapping tape and a custody seal, and shipped for overnight delivery to the designated laboratory.

4.6 QUALITY ASSURANCE/QUALITY CONTROL

In addition to the thirty soil boring samples collected, one duplicate sample, one equipment rinsate sample (one per day), and one trip blank (one per day) will be collected. The following QA/QC samples will be prepared and analyzed for the volatile organics:

- The field duplicate sample is collected to evaluate the overall precision of the field sampling and laboratory analysis, a field duplicate will be collected at one sample location. The duplicate sample will be collected using the same procedures as the original sample. The laboratory will be instructed to analyze the field duplicate sample using the same analytical procedures as the original sample.

- The equipment rinsate sample will be obtained by pouring laboratory reagent-grade water over or through sampling equipment into an appropriate sample container following the decontamination process. The equipment rinsate sample will be used to verify that the sample collection and handling process has not affected the quality of the samples.

- The trip blank is a blank sample consisting of reagent-grade water prepared by the laboratory. The purpose of this blank is to monitor any contaminants that may be transferred during shipment or present in the laboratory equipment or laboratory sample extraction procedures.

4.7 HEALTH AND SAFETY PLAN

A site-specific Health and Safety Plan has been prepared which establishes guidelines and requirements for the safety of field personnel during the field activities at the site. The Health and Safety Plan was developed based upon a review of available site background information and an evaluation of potential hazards, and is in compliance with applicable parts of the Occupational Health and Safety Agency (OSHA) Regulations 29 CFR 1910. All employees and subcontractors of WCC involved in this project will be required to abide by the provision of the Health and Safety Plan. Employees and subcontractors of WCC involved in this project will be required to abide by the provision of the Health and Safety Plan.

TABLE

TABLE 1
TARGET QUANTITATION LIMITS FOR TCL ORGANIC CONSTITUENTS
VOLATILE ORGANICS
METHOD 8240

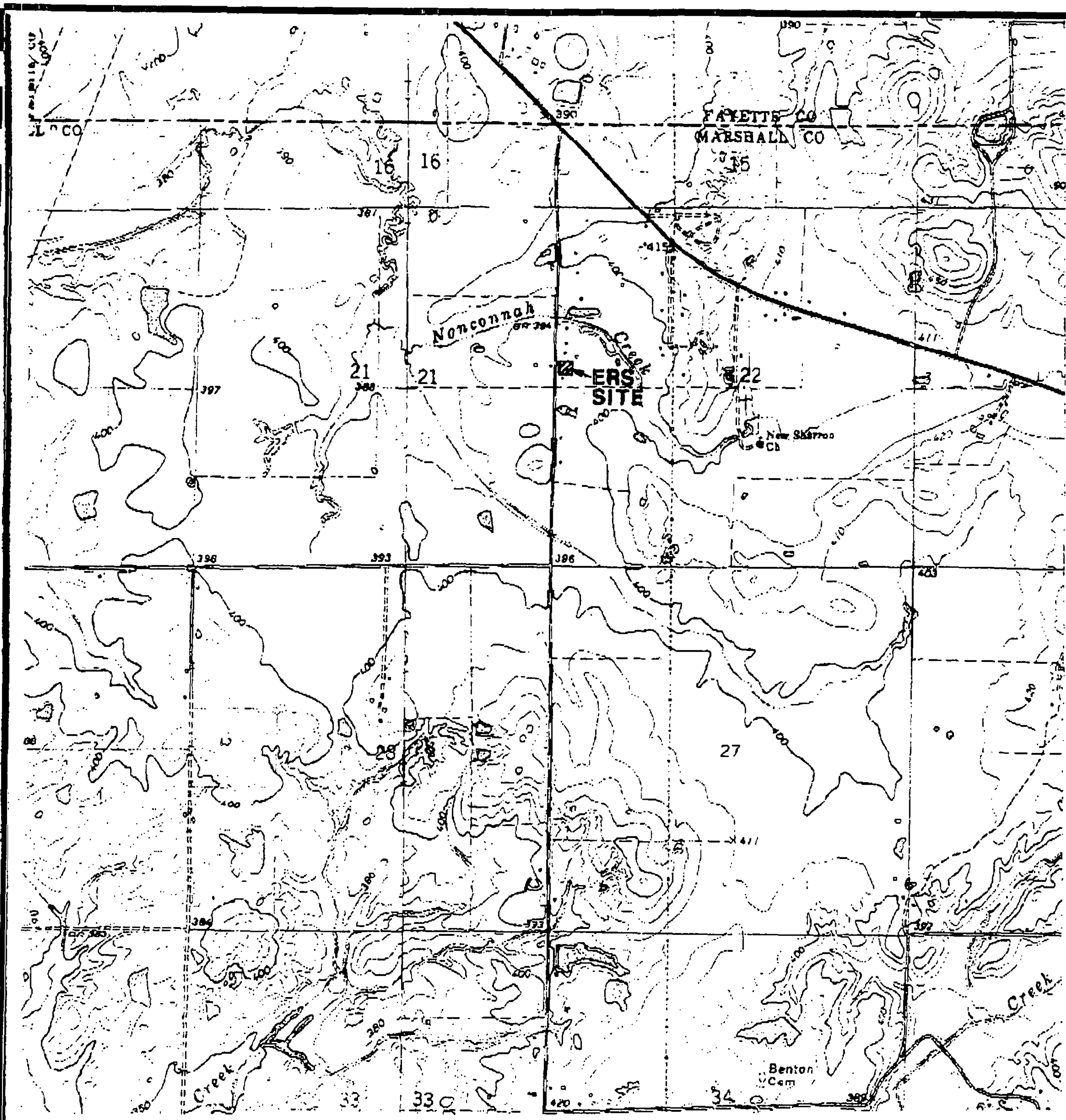
PARAMETERS	AQUEOUS (ug/l)[1]	SOIL (ug/kg)[2]
Acetone	10.0	10.0
Benzene	5.0	5.0
Bromodichloromethane	5.0	5.0
Bromoform	5.0	5.0
Bromomethane	10.0	10.0
2-Butanone (MEK)	10.0	10.0
Carbon disulfide	5.0	5.0
Carbon tetrachloride	5.0	5.0
Chlorobenzene	5.0	5.0
Chloroethane	10.0	10.0
Chloroform	5.0	5.0
Chloromethane	10.0	10.0
Dibromochloromethane	5.0	5.0
1,1 Dichloroethane	5.0	5.0
1,2 Dichloroethane	5.0	5.0
1,1 Dichloroethene	5.0	5.0
1,2 Dichloroethene (total)	5.0	5.0
1,2 Dichloropropane	5.0	5.0
cis-1,3-Dichloropropene	5.0	5.0
trans-1,3-Dichloropropane	5.0	5.0
Ethylbenzene	5.0	5.0
2-Hexanone	10.0	10.0
Methylene chloride	5.0	5.0
4-Methyl-2-pentanone (MIBK)	10.0	10.0
Styrene	5.0	5.0
1,1,2,2-Tetrachloroethane	5.0	5.0
Tetrachloroethene	5.0	5.0
Toluene	5.0	5.0
1,1,1-Trichloroethane	5.0	5.0
1,1,2-Trichloroethane	5.0	5.0
Trichloroethene	5.0	5.0
Vinyl acetate	10.0	10.0
Vinyl chloride	10.0	10.0
Xylenes (total)	5.0	5.0

TABLE 1 (Continued)
TARGET QUANTITATION LIMITS FOR TCL ORGANIC CONSTITUENTS
VOLATILE ORGANICS
METHOD 8240

Note:

[1] Specific quantitation limits are highly matrix dependent. The listed quantitation limits may not always be achievable.
[2] Listed quantitation limits for soils are based on wet weight; actual quantitation limits, based on <u>any</u> weight, will be higher.

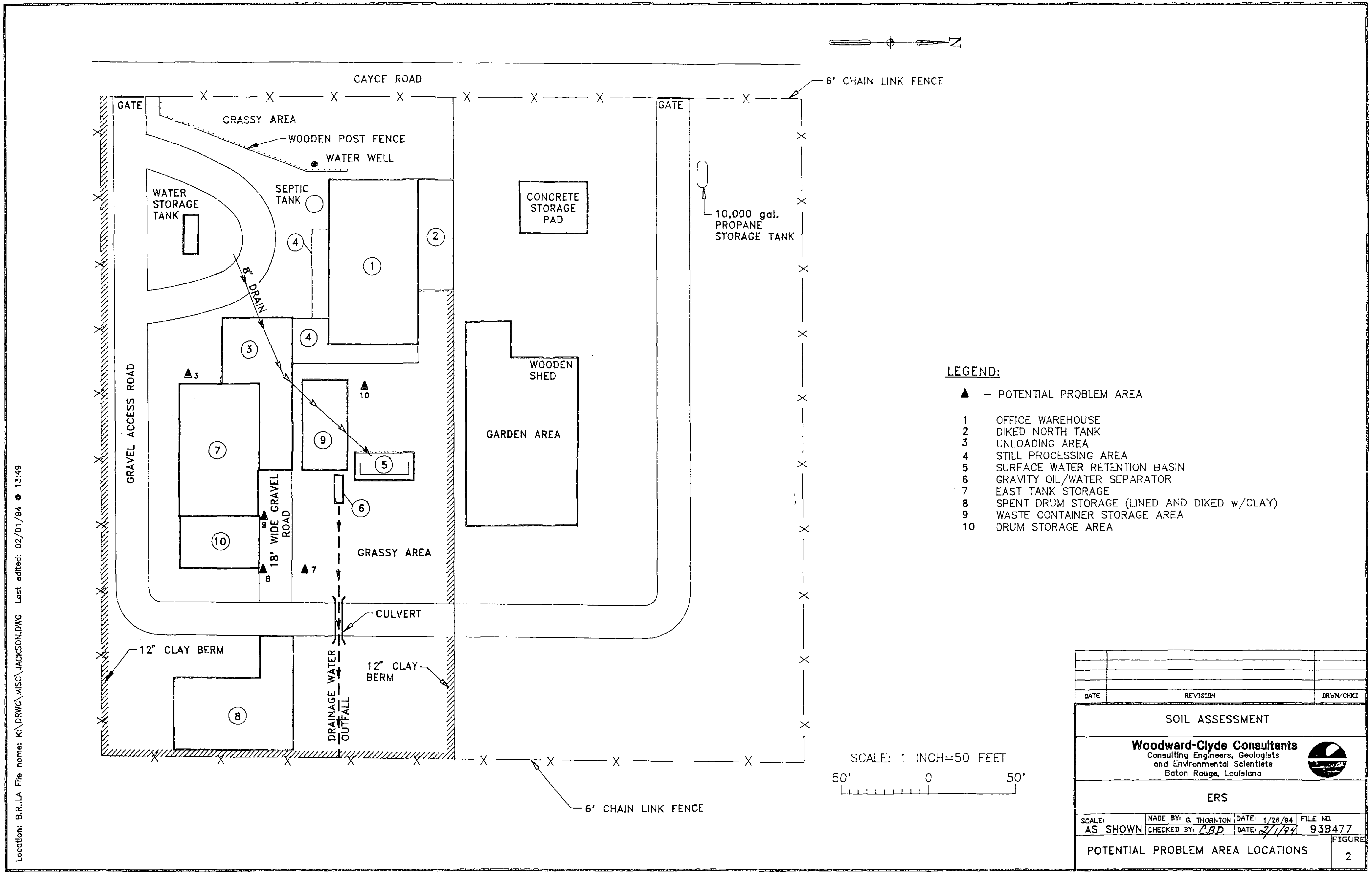
FIGURES



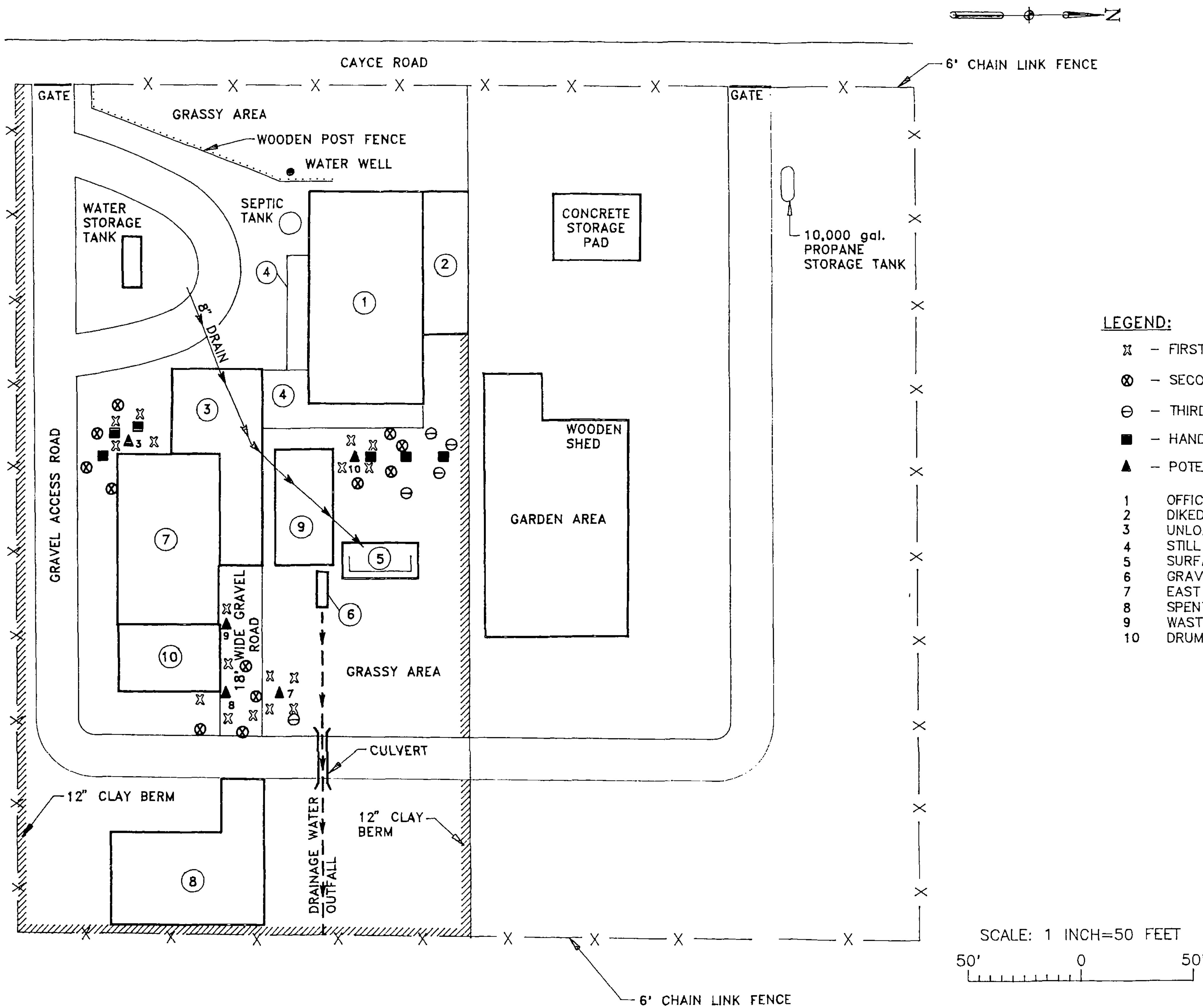
SOURCE:

U.S.G.S. 7.5 MINUTE SERIES QUADRANGLE MAPS,
Mt. Pleasant, MISS - TENN 1971
Byhalia NW, MISS - TENN 1971

ERS Site **Marshall County** **Mississippi**	Consulting Engineers, Geologists and Environmental Scientists Jackson, Mississippi SCALE: 1" = 2000' DRAWN BY: ACE — DATE: 1/21/94 CHKD. BY: JKM — DATE: 1/21/94	**SITE LOCATION MAP**	FILE NO. 93B477 FIG. NO. 1



Location: B.R._LA File name: K:\DRWG\MISC\JACKSON.DWG Last edited: 02/01/94 @ 13:49



LEGEND:

- ⌘ – FIRST TIER
- ⊗ – SECOND TIER
- ⊖ – THIRD TIER
- ■ – HAND AUGER BORING
- ▲ – POTENTIAL PROBLEM AREA

1. OFFICE WAREHOUSE
2. DIKED NORTH TANK
3. UNLOADING AREA
4. STILL PROCESSING AREA
5. SURFACE WATER RETENTION BASIN
6. GRAVITY OIL/WATER SEPARATOR
7. EAST TANK STORAGE
8. SPENT DRUM STORAGE (LINED AND DIKED w/CLAY)
9. WASTE CONTAINER STORAGE AREA
10. DRUM STORAGE AREA

DATE	REVISION	DRWN/CHKD

SOIL ASSESSMENT

Woodward-Clyde Consultants
Consulting Engineers, Geologists and Environmental Scientists
Baton Rouge, Louisiana

ERS

SCALE: AS SHOWN	MADE BY: G. THORNTON	DATE: 1/26/94	FILE NO. 93B477
	CHECKED BY: CBD	DATE: 2/1/94	

APPROXIMATE SAMPLE LOCATIONS

FIGURE 3

Location: B.R.,LA File name: K:\DRWG\MISC\JACKSON.DWG Last edited: 02/01/94 @ 13:49